Army Energy Program

SHOW ME THE MONEY

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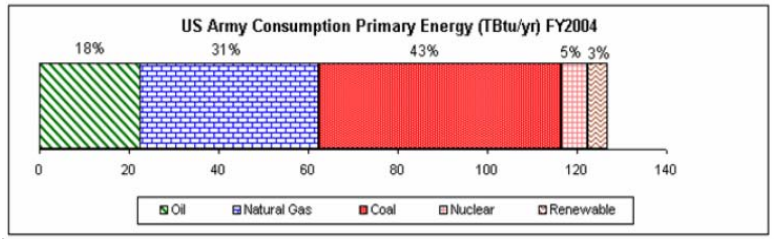
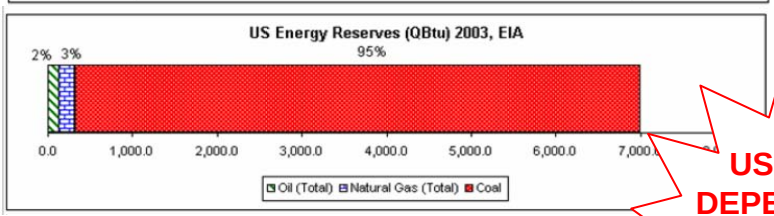
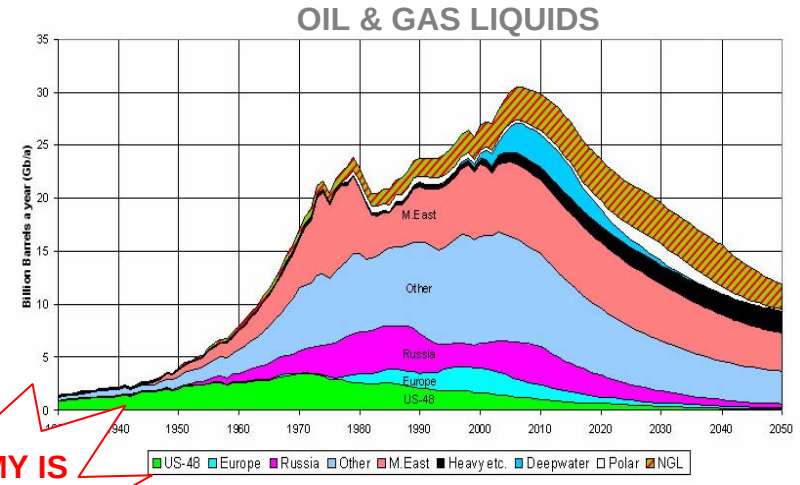
Challenges To Managing The Future

- ✓ World population growing: 2006 = 6.5 Billion, by 2030 estimate is 7.9 Billion
- ✓ World oil demand up since 2000: Up 7 million barrels per day (mbd), 2 mbd increase in China, 1.4 mbd increase in India.
- ✓ Hurricanes Katrina and Rita shut down 27% of US oil refining capacity, production is still off 400,000 barrels per day.
- ✓ US oil imports increasing: 33% in 1973, 58% in 2005, 70% by 2020.
- ✓ US LNG (liquid natural gas) imports increasing: 3% in 2005, 25% in 2020.
- ✓ In 1973 North America consumed twice as much oil as Asia. In 2005 Asian consumption exceeded that in North America
- ✓ US oil consumption up: 20.7 mbd in 2004, 21.1 mbd in 2005.

World Energy Situation



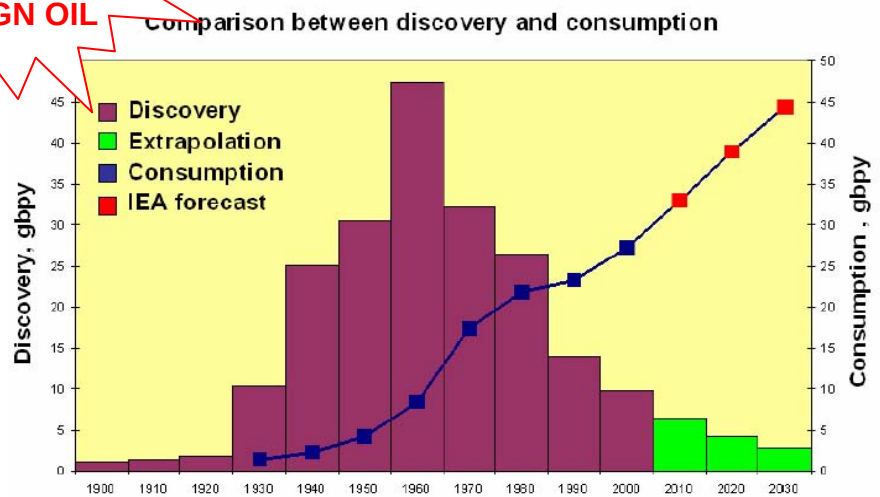




US ARMY IS DEPENDENT ON FOREIGN OIL

Army Energy

- 38% Rise in NTV Fuel Use
- 35% of DoD utilities
- 21% of Fed government
- 11% of installations' budget



Army Energy Strategy for Installations

The Army Energy Strategy looks out to 2030, based on five major initiatives:

- ✓ ***Eliminate energy waste in existing facilities;***
- ✓ ***Increase energy efficiency in renovation and new construction;***
- ✓ ***Reduce dependence on fossil fuels;***
- ✓ ***Conserve water resources; and***
- ✓ ***Improve energy security.***

** Approved by SECARMY and Chief of Staff of Army on 8 June 2005*

Army Energy and Water Campaign Plan

The road map for achieving the Army Energy Strategy for Installations

✓ ***Provides the way ahead for leveraging policy, programs, resources and other investment programs to meet EPACT 2005 and other Army energy and water goals.***

✓ ***Provides detailed plans, identifies metrics, lead agents and other resources needed to execute the strategy.***

✓ ***Provides the POM 08-13 investment plan, identifies projects and systems, ties in all energy users and policy proponents (e.g., security, privatization, procurement, technology, construction, and environmental concerns).***

How We Plan to Get There?

- ✓ Energy efficient renovation & new construction
- ✓ Energy conservation retrofit projects
  - -- alternative financing
  - -- direct appropriations
- ✓ Purchase/ Invest in Renewable Energy
  - -- Solar Thermal
  - -- Photovoltaic
  - -- Wind, Geothermal
  - -- Biomass
- ✓ Privatize/ Modernize Utility Systems

ENERGY PROGRAMS

- ECIP
- ESPC/UESC
- EUL
- REMs
- AEWRS
- AWARDS
- Utility Rate Intervention Program
- Utility Privatization (UP)

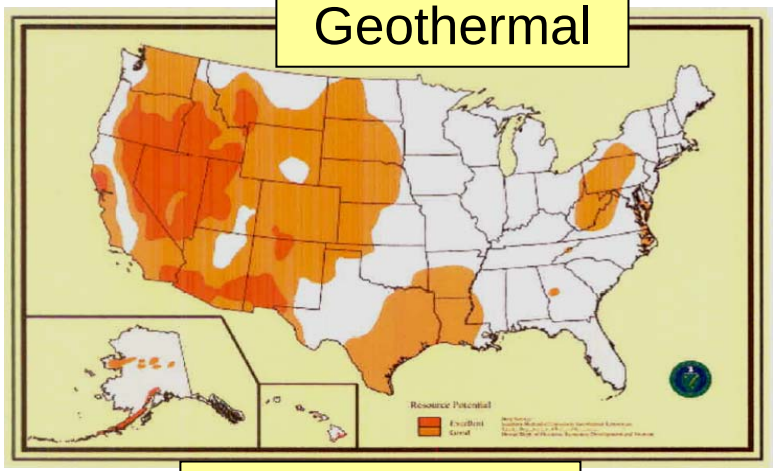
Renewables

Renewable Resources

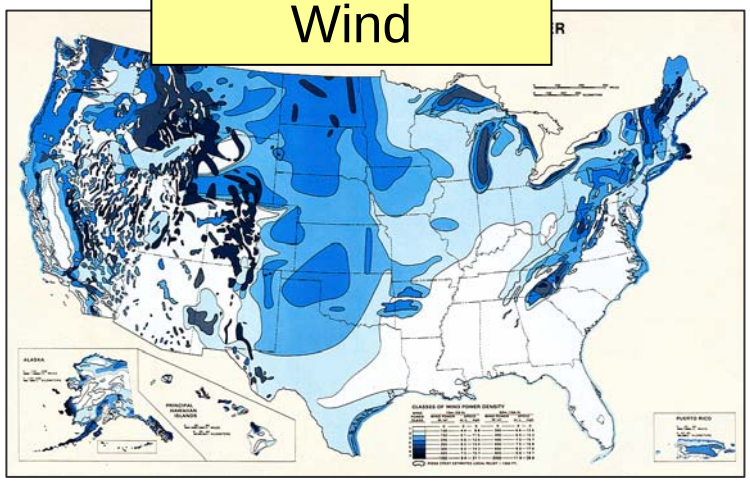
National Renewable Energy Lab

http://www.nrel.gov/gis/

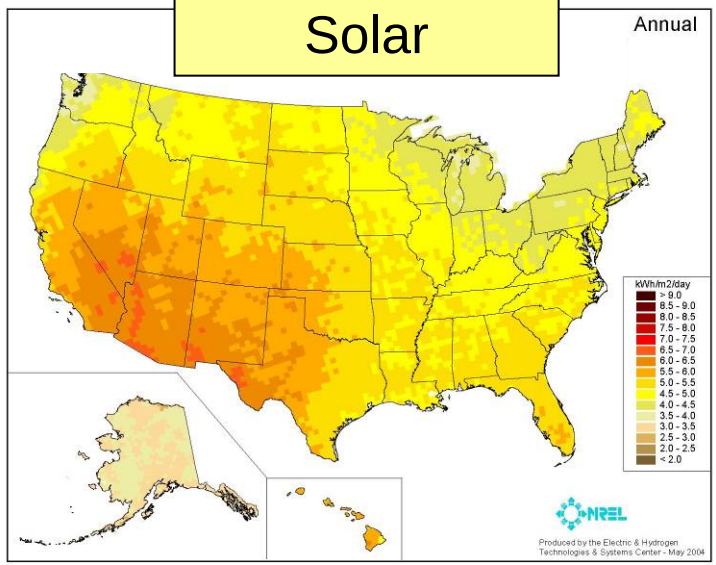
Geothermal



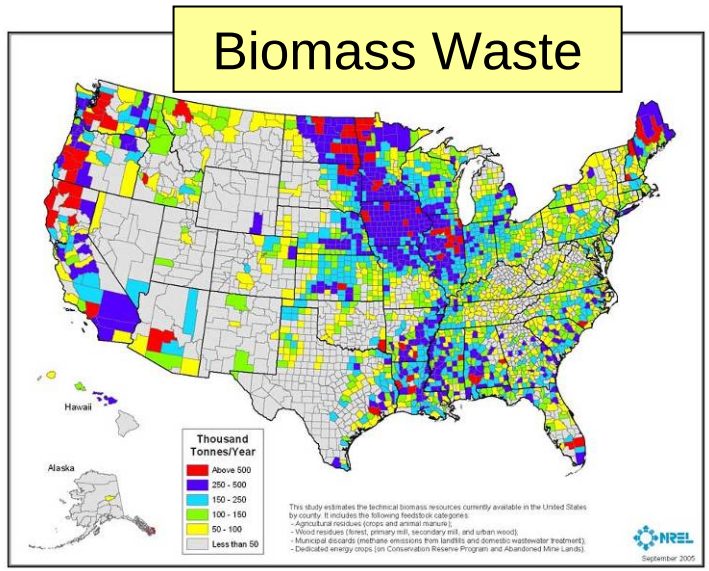
Wind



Solar



Biomass Waste



Renewable & Distributed Energy Technologies

Solar Water Heating
Fort Huachuca, AZ

Wind Power
Camp Williams, UT

Fuel Cell, Fort Richardson. AK

New Jersey National Guard Bureau
10 KVA Photovoltaic Array

Renewable & Distributed Energy Technologies

Photovoltaic Applications

Grid Connected Array – Yuma Proving Ground, AZ

Remote Power Generation – Kwajalein Atoll

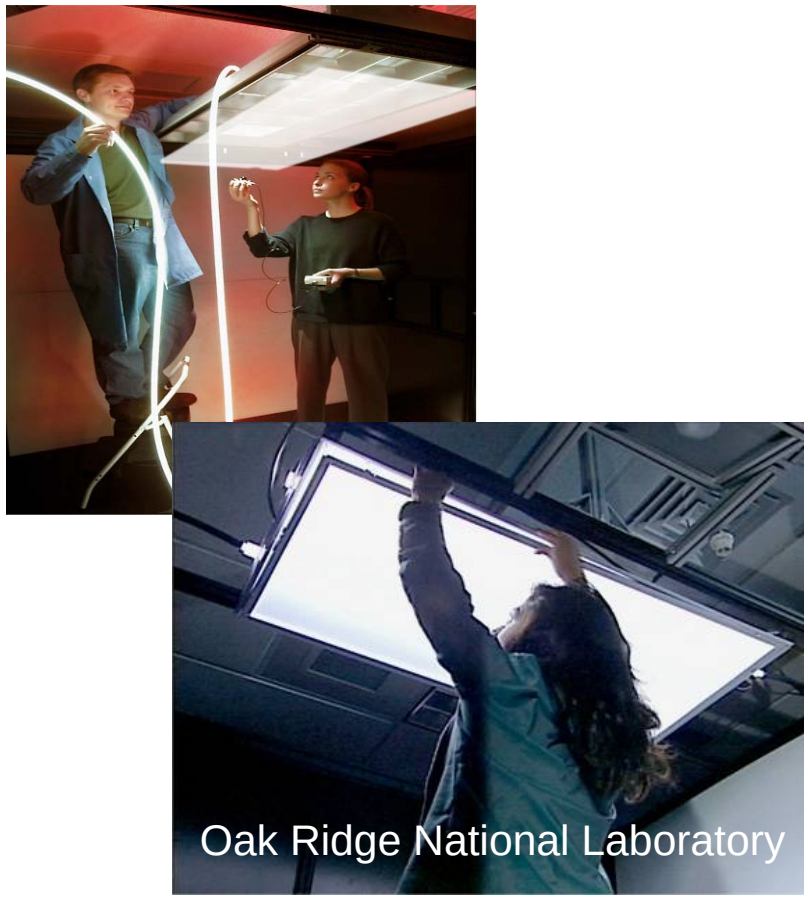
Lighting, Fort Irwin, CA

Hybrid Solar Lighting System

- Building lighting system combining sunlight with hybrid luminaires
- Sunlight can also be used as a distributed power generation system
- Roof-mounted light concentrator with fiber optics to distribute light to hybrid luminaries
- Provides nearly 100% of lighting needed in daytime with little heat
- Each system lights 500-700 ft^2 of floor space

Hybrid Solar Lighting System Collector & Luminaire

- Collector on top of building focuses the *visible* portion of light into optic fibers
- Collector converts IR radiation from light into electricity via thermo-photovoltaic cell
- Hybrid luminaires contain both conventional lamps (T8/T5) + fiber optics
- Lamps dim when sunlight provides most of the required light
- With little or no sunlight, electric lamps maintain desired illumination level



PowerFilm® Solar Fabric Tent

- Solar thin film integrated into tent fabric
  - Made of silicon. Rolled into tissue paper then attached to flexible plastic in the tent-making process
- Self contained backyard power ranging from 200W to 1kW.
- Several tents can be joined together to increase capacity
- Energy can be stored in batteries for nighttime use

Iowa Thin Film Technologies
www.iowathinfilm.com

Iowa Thin Film Technologies Inc.

WASTE TO ENERGY

Ft. Stewart wood plant

Waste to Oil

GEOTHERMAL

Disney Area
HVAC Renovation

Fort Knox, KY

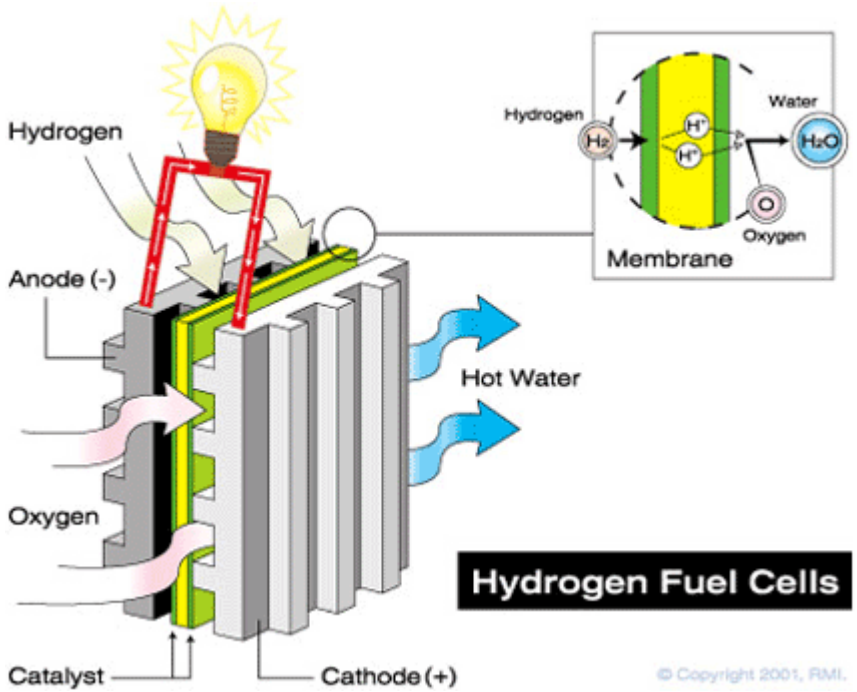
Old Inefficient
Boiler Plant
101,000 MMBtu

Renewable Geothermal Well Field

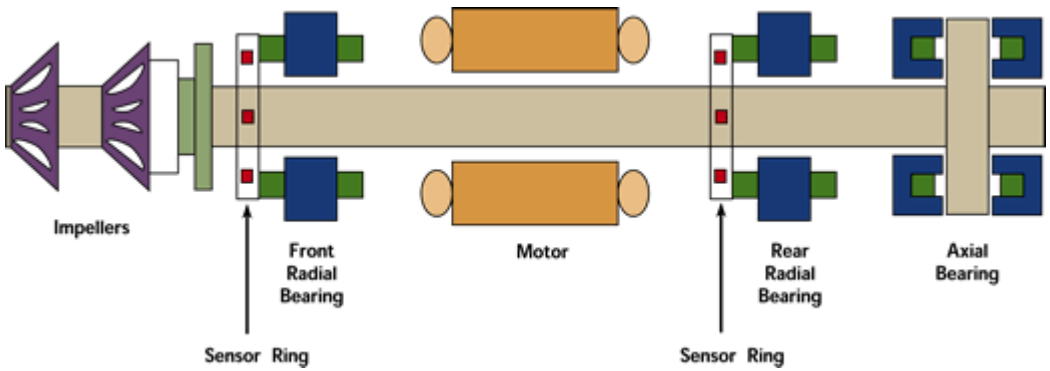
ALTERNATIVE FUELS

- **B20 Biodiesel - blends available up to 100%**
- **E85 Ethanol - blends up to 100%**
- **Fischer Trope Fuels – Liquefied Coal**
- **Algae to Fuel**

FUEL CELLS

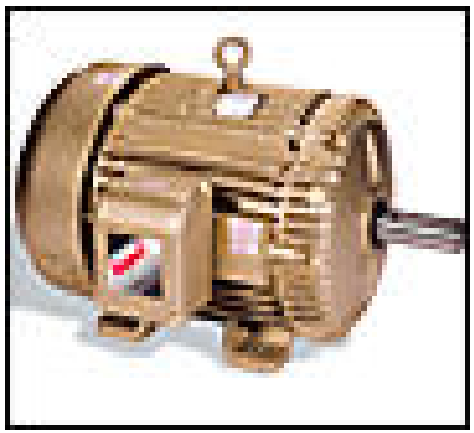

Hydrogen
Anode (-)
Oxygen
Catalyst
Cathode (+)
Hot Water
Hydrogen
Water
Oxygen
Membrane
Hydrogen Fuel Cells
© Copyright 2001, RMI.

Magnetic Bearings



Variable Frequency Drive Systems

Premium Efficiency



DC motors

Pressure Reducing (PR) Energy Recovery

- Conventional PR valves, reduce pressure by friction, without useful work
- Microturbine-generator PR energy recovery systems:
  - Flow-to-Wire *Rentricity.com*
  - Energy Commander System *Internalhydro.com*
  - Gas PR Generator *ElectraTherm.com*
- May substitute for PR for water, other fluids, or gas

What Can You do RIGHT NOW

- Use programmable thermostats that automatically increase temperature set points in the summer and reduce them in the winter. If programmable thermostats are not installed then manually set the temperature to 82-85 F in the summer and 57-60 F in the winter. Occupied at 70-74 F.

•Turning off all computer equipment every night. The computer folks are not following the Army's policy. They are wrong and they do not pay the bill. Updates can automatically download when you push the shut down button and the computer will update prior to completing the shut down cycle.

•Turn off your lights every time you leave a room as the last person even for one second. Do not listen to those unknowledgeable folks who says it takes more energy to turn off and on that to just leave on. That is as false as leaving buildings at a constant temperature.

• Point out to supervisors, instructors, maintenance folks, and Commanders when you see out side lighting on during the day. If you pay attention, you will begin to see lights on outside everywhere as you become aware that we truly are very wasteful.

•Do not leave fans, pumps, radios, battery chargers, charging transformers, exhaust fans, coffee pots, any appliance or equipment running when no one is using them.


Beware of low
flying aircraft

QUESTIONS?

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http://www.hqda.army.mil/acsimweb/homepage.shtml

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